

FS50UM-2

HIGH-SPEED SWITCHING USE

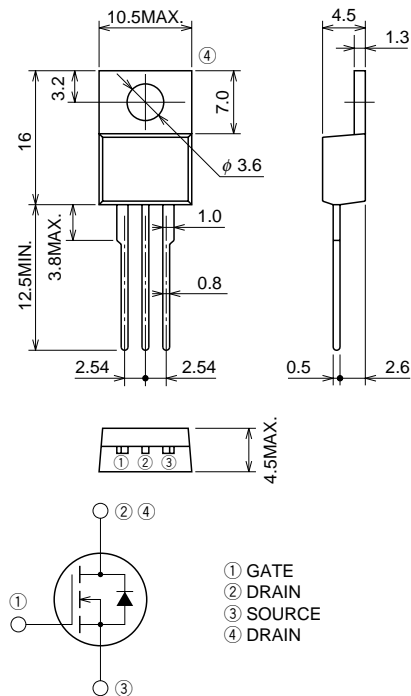
FS50UM-2



- 10V DRIVE
- $V_{DS}$  ..... 100V
- $r_{DS(ON)}$  (MAX) ..... 55m $\Omega$
- $I_D$  ..... 50A
- Integrated Fast Recovery Diode (TYP.) ..... 105ns

OUTLINE DRAWING

Dimensions in mm



TO-220

APPLICATION

Motor control, Lamp control, Solenoid control  
DC-DC converter, etc.

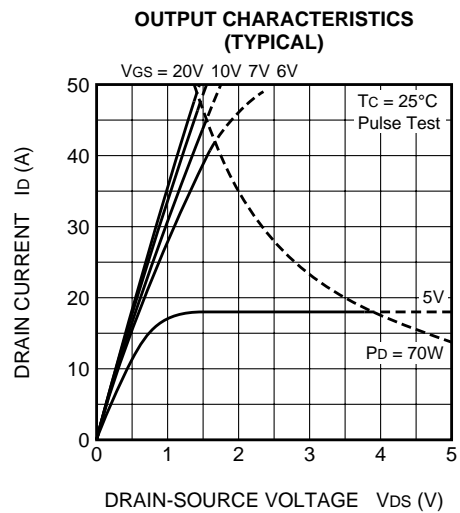
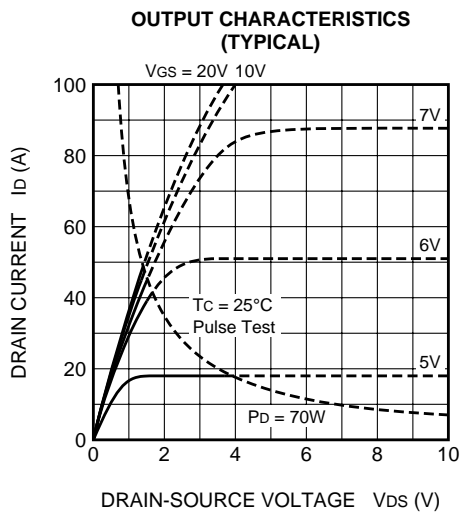
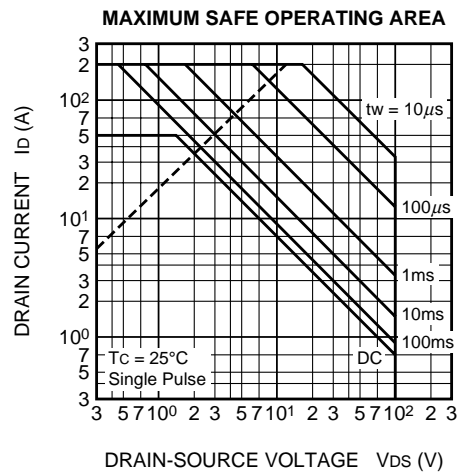
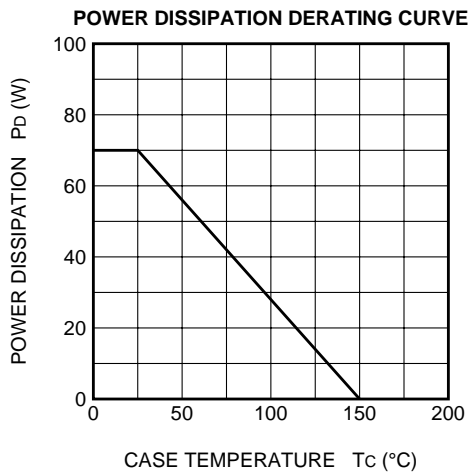
MAXIMUM RATINGS (Tc = 25°C)

Symbol	Parameter	Conditions	Ratings	Unit
$V_{DS}$	Drain-source voltage	$V_{GS} = 0V$	100	V
$V_{GS}$	Gate-source voltage	$V_{DS} = 0V$	$\pm 20$	V
$I_D$	Drain current		50	A
$I_{DM}$	Drain current (Pulsed)		200	A
$I_{DA}$	Avalanche drain current (Pulsed)	$L = 50\mu H$	50	A
$I_S$	Source current		50	A
$I_{SM}$	Source current (Pulsed)		200	A
$P_D$	Maximum power dissipation		70	W
$T_{ch}$	Channel temperature		$-55 \sim +150$	$^{\circ}C$
$T_{stg}$	Storage temperature		$-55 \sim +150$	$^{\circ}C$
—	Weight	Typical value	2.0	g

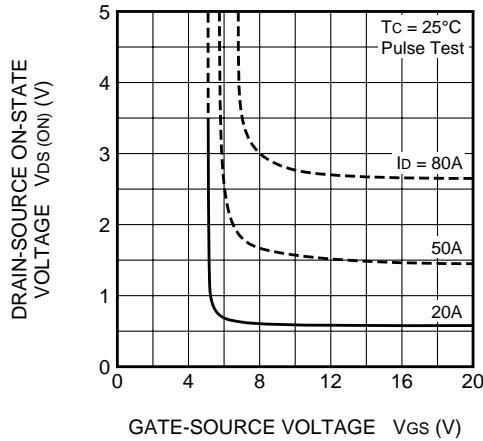
ELECTRICAL CHARACTERISTICS (T<sub>ch</sub> = 25°C)

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
V <sub>(BR)DSS</sub>	Drain-source breakdown voltage	I <sub>D</sub> = 1mA, V <sub>GS</sub> = 0V	100	—	—	V
I <sub>GSS</sub>	Gate-source leakage current	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	—	—	±0.1	μA
I <sub>DSS</sub>	Drain-source leakage current	V <sub>DS</sub> = 100V, V <sub>GS</sub> = 0V	—	—	0.1	mA
V <sub>GS(th)</sub>	Gate-source threshold voltage	I <sub>D</sub> = 1mA, V <sub>DS</sub> = 10V	2.0	3.0	4.0	V
r <sub>DS(on)</sub>	Drain-source on-state resistance	I <sub>D</sub> = 25A, V <sub>GS</sub> = 10V	—	39	55	mΩ
V <sub>DS(on)</sub>	Drain-source on-state voltage	I <sub>D</sub> = 25A, V <sub>GS</sub> = 10V	—	0.98	1.38	V
y <sub>fs</sub>	Forward transfer admittance	I <sub>D</sub> = 25A, V <sub>DS</sub> = 10V	—	33	—	S
C <sub>iss</sub>	Input capacitance	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V, f = 1MHz	—	2300	—	pF
C <sub>oss</sub>	Output capacitance		—	410	—	pF
C <sub>rss</sub>	Reverse transfer capacitance		—	185	—	pF
t <sub>d(on)</sub>	Turn-on delay time	V <sub>DD</sub> = 50V, I <sub>D</sub> = 25A, V <sub>GS</sub> = 10V, R <sub>GEN</sub> = R <sub>GS</sub> = 50Ω	—	35	—	ns
t <sub>r</sub>	Rise time		—	86	—	ns
t <sub>d(off)</sub>	Turn-off delay time		—	100	—	ns
t <sub>f</sub>	Fall time		—	80	—	ns
V <sub>SD</sub>	Source-drain voltage	I <sub>S</sub> = 25A, V <sub>GS</sub> = 0V	—	1.0	1.5	V
R <sub>th(ch-c)</sub>	Thermal resistance	Channel to case	—	—	1.78	°C/W
t <sub>rr</sub>	Reverse recovery time	I <sub>S</sub> = 50A, di/dt = -100A/μs	—	105	—	ns

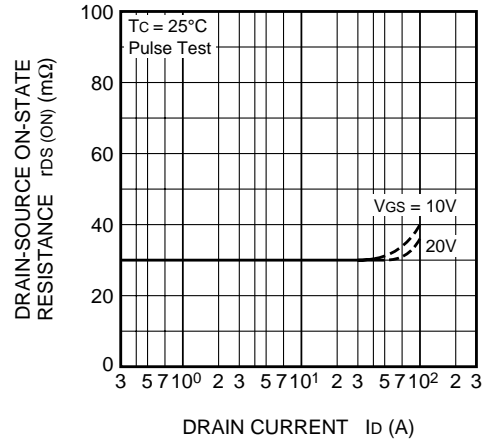
PERFORMANCE CURVES



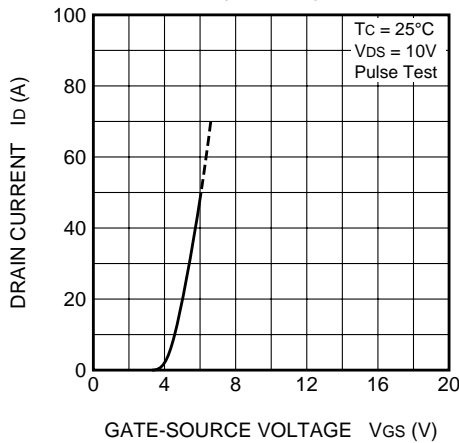
ON-STATE VOLTAGE VS.  
GATE-SOURCE VOLTAGE  
(TYPICAL)



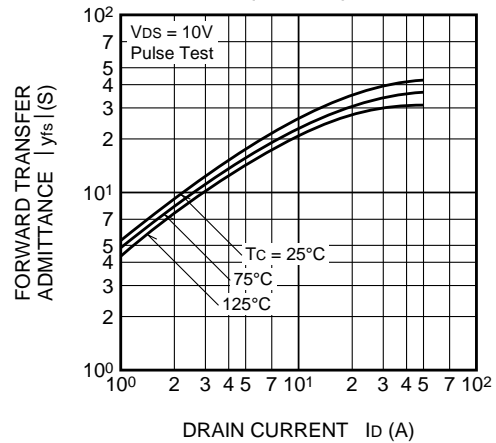
ON-STATE RESISTANCE VS.  
DRAIN CURRENT  
(TYPICAL)



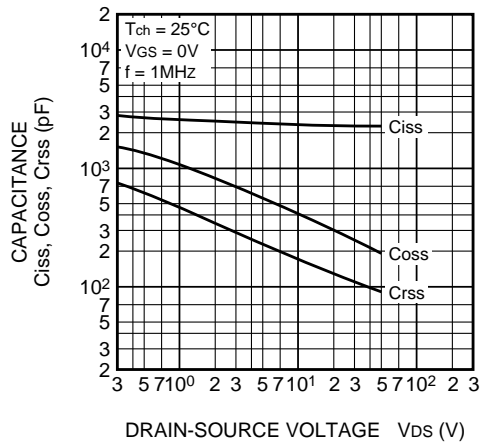
TRANSFER CHARACTERISTICS  
(TYPICAL)



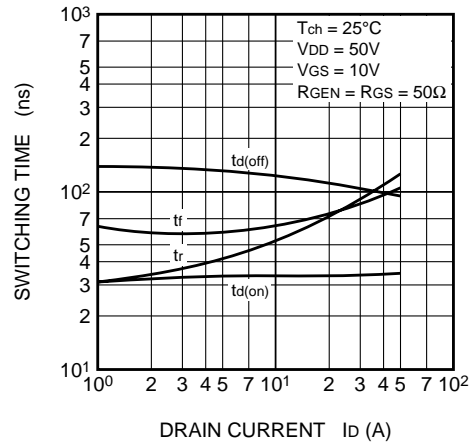
FORWARD TRANSFER ADMITTANCE  
VS. DRAIN CURRENT  
(TYPICAL)



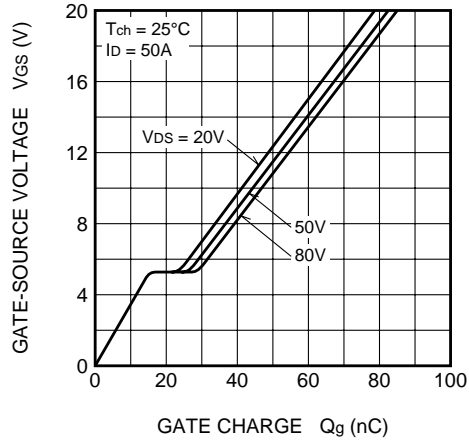
CAPACITANCE VS.  
DRAIN-SOURCE VOLTAGE  
(TYPICAL)



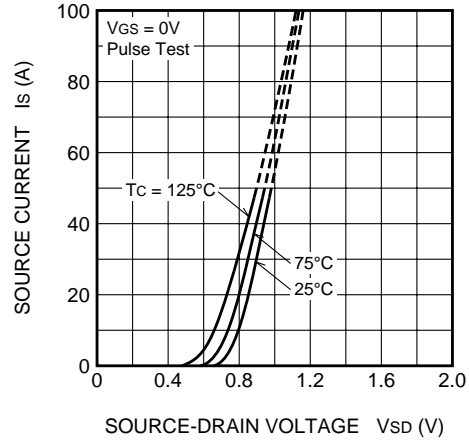
SWITCHING CHARACTERISTICS  
(TYPICAL)



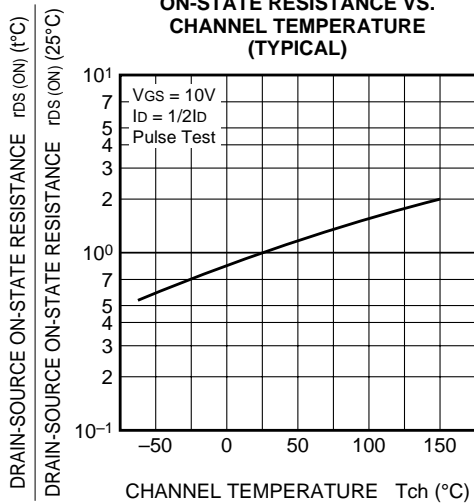
GATE-SOURCE VOLTAGE  
VS. GATE CHARGE  
(TYPICAL)



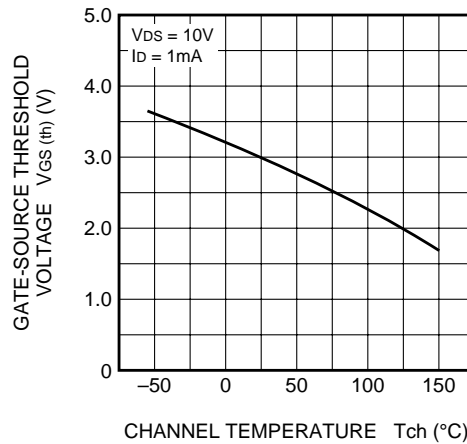
SOURCE-DRAIN DIODE  
FORWARD CHARACTERISTICS  
(TYPICAL)



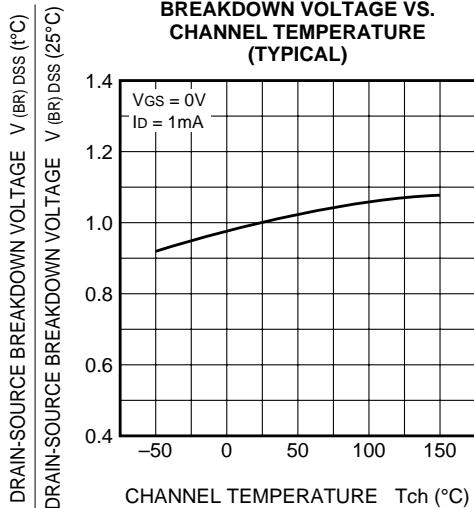
ON-STATE RESISTANCE VS.  
CHANNEL TEMPERATURE  
(TYPICAL)



THRESHOLD VOLTAGE VS.  
CHANNEL TEMPERATURE  
(TYPICAL)



BREAKDOWN VOLTAGE VS.  
CHANNEL TEMPERATURE  
(TYPICAL)



TRANSIENT THERMAL IMPEDANCE  
CHARACTERISTICS

